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EVALUATIONS OF SOVIET SURFACE-TO-SURFACE MISSILE DEPLOYMENT 25TH REVISION

A Report of the Deployment Working Group
of the
Guided Missile and Astronautics Intelligence Committee

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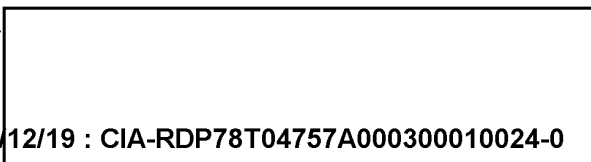
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DEPLOYMENT WORKING GROUP

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Photographic Interpreter support is provided by the Photographic Analysis Group, NPIC.

NOTE: All correspondence relative to this report should be directed to the Chairman, Guided Missile and Astronautics Intelligence Committee (GMAIC).

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PREFACE

This report, published bimonthly by the GMAIC Deployment Working Group (DWG), provides a comprehensive, ready-reference listing of all ICBM, IRBM, and MRBM deployment locations, types of site configurations, photographic references, estimated construction and operational status, and other evaluations by the DWG. These data constitute the majority view of the DWG membership, and may not correspond precisely to individual assessments by each member. Additional data may be added to future revisions.

Dissemination of the report was previously limited to holders of the DWG report, Soviet Surface-to-Surface Missile Deployment. Because the information contained herein is both supplemental and self-sustaining, distribution will no longer be limited to holders of the above report.

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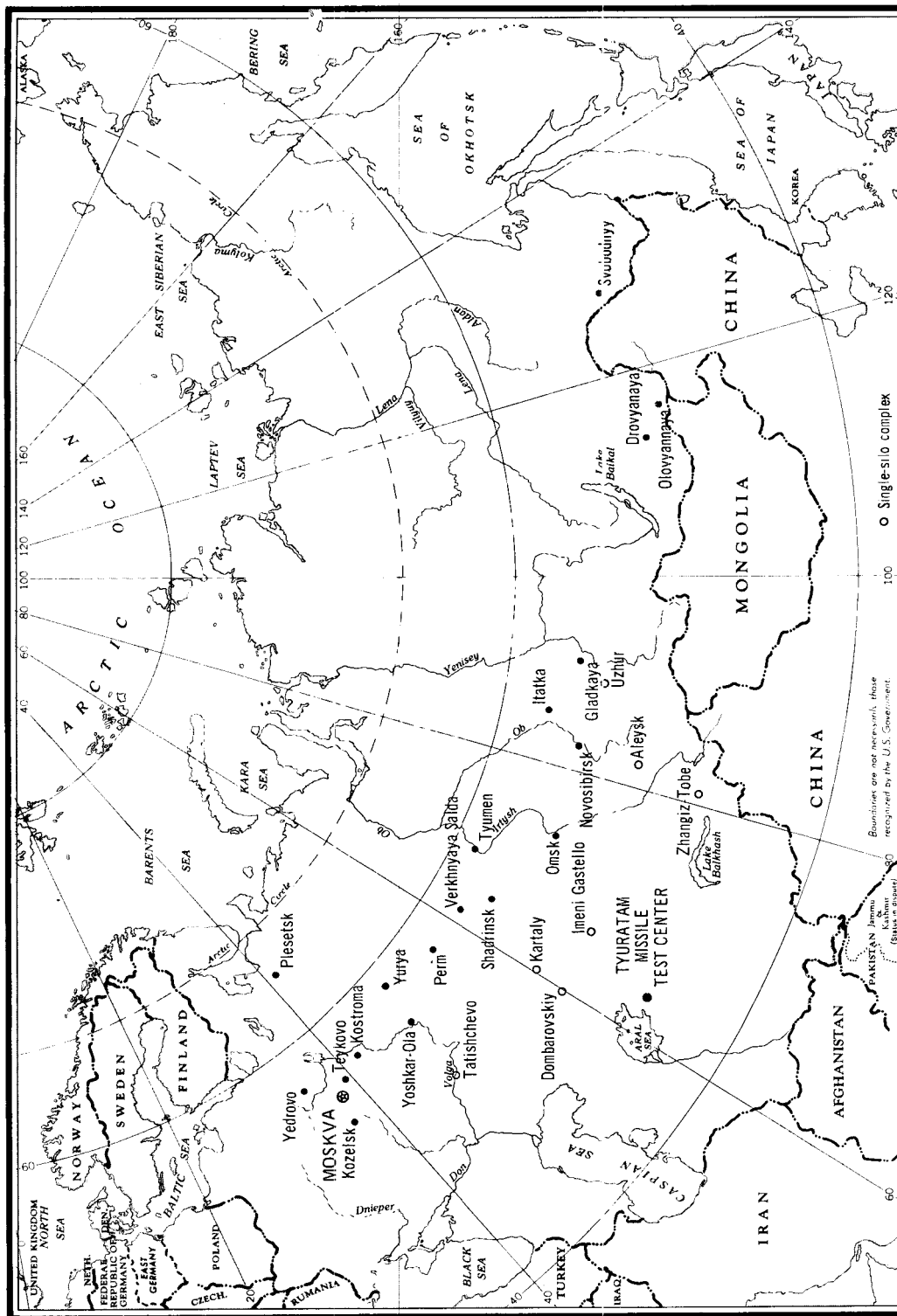


FIGURE 1. DEPLOYMENT OF SOVIET ICBM COMPLEXES.

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INTRODUCTION

This report is the 25th Revision of Evaluations of Soviet Surface-to-Surface Missile Deployment prepared by the Deployment Working Group (DWG) of the Guided Missile and Astronautics Intelligence Committee (GMAIC). The information contained in this and previous revisions is self-sustaining and supplements the basic DWG report Soviet Surface-to-Surface Missile Deployment which provides detailed information on individual launch facilities of the Soviet Strategic Rocket Forces. The basic report, dated 1 January 1962 (Control Number [redacted]) has been revised and updated on a periodic basis. Further updating is accomplished in reports prepared and published for GMAIC by the National Photographic Interpretation Center (NPIC).

This 25th Revision covers the period from [redacted] [redacted] missions flown during this period, and continuing analysis of previous missions and other sources have provided additional information on the Soviet strategic missile deployment program. A summary of estimated status of identified ICBM, IRBM, and MRBM launchers at deployed complexes is given in Table 1. The other tables (2 through 10) normally included in this report will be published in the 26th Revision. Cutoff date for information in this report is [redacted]

SOVIET ICBM DEPLOYMENT

Significant developments in the Soviet ICBM deployment program since publication of our 24th Revision include the identification of additional single silos under construction at the deployed complexes, a new assessment of the construction techniques employed in building Type IIID silos, and the identification of propellant storage facilities in the rail-to-road

transfer points of complexes with Type IIIC and IIID deployment.

CURRENT DEPLOYMENT

No new ICBM complexes have been discovered since our last revision; the number identified remains at 25. See Figure 1 for locations of deployed ICBM complexes. These complexes now contain a total of 716 confirmed and probable launchers of which 150 are soft and 566 are hard. This represents an increase of 48 launchers over the number reported in our 24th Revision. Included in the hard launcher count are 488 single silos in various stages of construction. In addition, we are presently carrying 28 single silos in the possible category which are not included in the total launcher count.

Of the 716 confirmed and probable launchers 388 are estimated to be operational, including 192 in a hard configuration. We believe that 47 of the 58 launchers at Tyuratam are now completed and, although not normally considered as part of the operational ICBM force, some of them could be used operationally. The ICBM sites have been designated by type, as shown and explained in Figure 2.

PROPELLANT STORAGE FACILITIES ASSOCIATED WITH TYPE IIIC AND IIID DEPLOYMENT

A central liquid-propellant storage facility has been identified in the rail-to-road transfer point at 15 known ICBM complexes where Type IIIC and IIID launch sites are deployed (Figure 3). This facility is always adjacent to the rail line in the transfer point and contains 2 large earth-mounded arch-roofed structures, 4 rail-served tank car off-loading points, 2 smaller earth-mounded arch-roofed drive-in structures, 2 semiburied flat-topped cylindrical tanks, 1 rectangular flat-roofed building, a large 4-bay drive-in building (IIIC complexes only), 2 propellant-transporter garages, and 4 basins.

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With the advent of the IIID missile system at the Yedrovo ICBM Complex (Figure 4), both large earth-mounded arch-roofed structures were observed under construction on []

[] One of these structures had approximately half the arches in place, and on the exposed floor area were 6 horizontal tanks situated parallel to the long axis of the structure; 12 of these tanks would cover the entire floorspace of each structure. The same type of structures were observed under construction at the Drovyanaya ICBM Complex on [] but no tanks were observed.

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A propellant storage facility of this type was observed in the early stages of construction in the north portion of the transfer point at the Kostroma ICBM Complex (Figure 5) on []

[] The 2 large and 2 smaller arch-roofed structures were all under construction at the same time. A rectangular building was also under construction between the large arch-roofed structures. Five tanks were being positioned on the floor of the large arch-roofed structure, and 7 additional tanks were observed on the loop road adjacent to the original propellant storage facility. The tanks are all approximately 45 by 10 feet, each with a capacity approximately 100,000 liters (26,400 US gallons).

The large arch-roofed structures are earth mounded upon completion, and personnel entrances are located at both ends. Also, 2 small square structures are visible at ground level alongside each structure, and 3 vents are present atop one end of each structure. Two rail-served tank car off-loading points are installed adjacent to each large earth-mounded arch-roofed structure, either as it is being mounded or shortly thereafter. At the Type IIID complexes, there appears to be an overhead pipe connecting each off-loading point to a probable

pumphouse across the road, and continuing into the large earth-mounded structure. The off-loading of propellant at the Type IIIC complexes appears to be an underground process. The smaller earth-mounded arch-roofed structure associated with each of the large structures has an entranceway at one end to allow either drive-in or back-in vehicular access. Ditching is frequently observed between the semiburied flat-topped tanks and the smaller arch-roofed structures.

The 4 water basins at the Type IIID complexes have been constructed in 2 patterns; either 4 in a square grouping, or 2 basins in each of 2 groups. The basins at the Type IIIC complexes are always in 2 distinctly separated pairs, and each pair will be served by a well-engineered road connecting with the transfer point loop road. Occasionally, especially at the Type IIID complexes, ditching appears to connect the cylindrical tank and the small arch-roofed structure with the basins. In any event, there is a definite relationship between the basins, the tanks, the small arch-roofed structures, and the large earth-mounded structures. The rectangular flat-roofed building, located either between the pair of smaller arch-roofed structures or the pair of large arch-roofed structures, is approximately 100 by 40 feet; its function is undetermined.

In many respects, the propellant storage facilities associated with the Type IIIC and IIID complexes are very similar. Those associated with Type IIIC complexes appear to be the more complex, however, consisting of a number of items not readily apparent at the IIID complexes. At the former, a small water treatment basin, which may be either round, square, or rectangular in shape, is associated with only the larger earth-mounded arch-roofed structure nearest the rail entrance to the transfer point. An additional small, square 2-bay building is

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associated with each of the probable propellant-transporter garages. Also, an aboveground system of large-diameter ventiducts is connected to each of the earth-mounded arch-roofed structures; 2 ducts connect with the large earth-mounded arch-roofed structure, and 1 duct with the small earth-mounded arch-roofed structure. These ducts terminate in apparent ventilators at some distance from the earth-mounded structures. The same type of ducting although earth mounded, is apparent at the Type IIIC complexes. Ducting at the Type IIIC complexes will also probably be eventually earth mounded.

It is possible that propellant of a toxic nature is stored in the large earth-mounded arch-roofed structure, and handled or loaded in trucks in the smaller earth-mounded arch-roofed structure; if such is the case, complete venting of these structures would be necessary to alleviate toxicity.

Two other items of interest at the Type IIIC complexes may be flare/vent stacks associated with propellant storage. At present, these appear to be pipelines laid on lattice-work which terminates on a fenced concrete pad near the back fenceline of the propellant storage area of the transfer point. The pipelines appear to originate at the large earth-mounded arch-roofed structure. Only 2 of the propellant storage facilities at Type IIIC complexes (Drovyannaya and Olovyannaya) have progressed far enough in construction to identify these possible flare/vent stacks; the pipelines at these facilities are underground.

At the Drovyannaya, Olovyannaya, and Perm Complexes (Figures 6, 7, and 8), the central propellant storage facility is colocated with the propellant storage facility originally designed to serve the Type II and Type IIIA launch sites for the SS-7 ICBM. The original facility consists of 4 rail-served tank car off-loading

points, 2 combination pumphouse/propellant storage sheds, and an earth-mounded structure between the pumphouse/propellant storage sheds. The Gladkaya and Yedrovo Complexes have both the old and new types of propellant storage facilities in the same area of the transfer point, but they are on opposite sides of the rail line from each other. At the Svobodnyy Complex (Figure 9) the 2 facilities are on the same side of the rail line, but are separate and distinct. The new-type propellant storage at Kozelsk (Figure 10), the only known SS-8 missile complex where Type IIIC deployment has been identified, is in a newly constructed area. Tatishchevo (Figure 11), the only complex comprised solely of Type IIIC launch sites, has only the new-type propellant storage facility in its transfer point.

The propellant storage facilities at each of the 6 Type IIIC ICBM complexes (Figures 12 through 17) are very similar in size and components. As there is only one type of missile deployed at these complexes, the new-type propellant facility would satisfy the requirements for the storage and handling of the liquid propellants involved. Many probable propellant-transporter trucks have been observed at those propellant storage facilities which are nearing completion. Rail tank cars have been observed on the sidings at propellant off-loading points.

The association of particular buildings within the facilities has been determined, but the precise function of each in relation to another is undetermined. Since there is always a paired relationship of 2 tank car off-loading points, 1 large earth-mounded arch-roofed structure, 1 small earth-mounded arch-roofed structure, 1 semiburied flat-topped tank, and 2 basins, it is possible that half of the facility is used to handle fuel and the corresponding half to handle oxidizer.

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FIGURE 3. CENTRALIZED PROPELLANT STORAGE FACILITIES AT SINGLE-SILO ICBM COMPLEXES.

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FIGURE 5. PROPELLANT STORAGE FACILITY, KOSTROMA ICBM COMPLEX.

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FIGURE 6. PROPELLANT STORAGE FACILITY, DROVYANAYA ICBM COMPLEX.

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FIGURE 10. PROPELLANT STORAGE FACILITY, KOZELSK ICBM COMPLEX.

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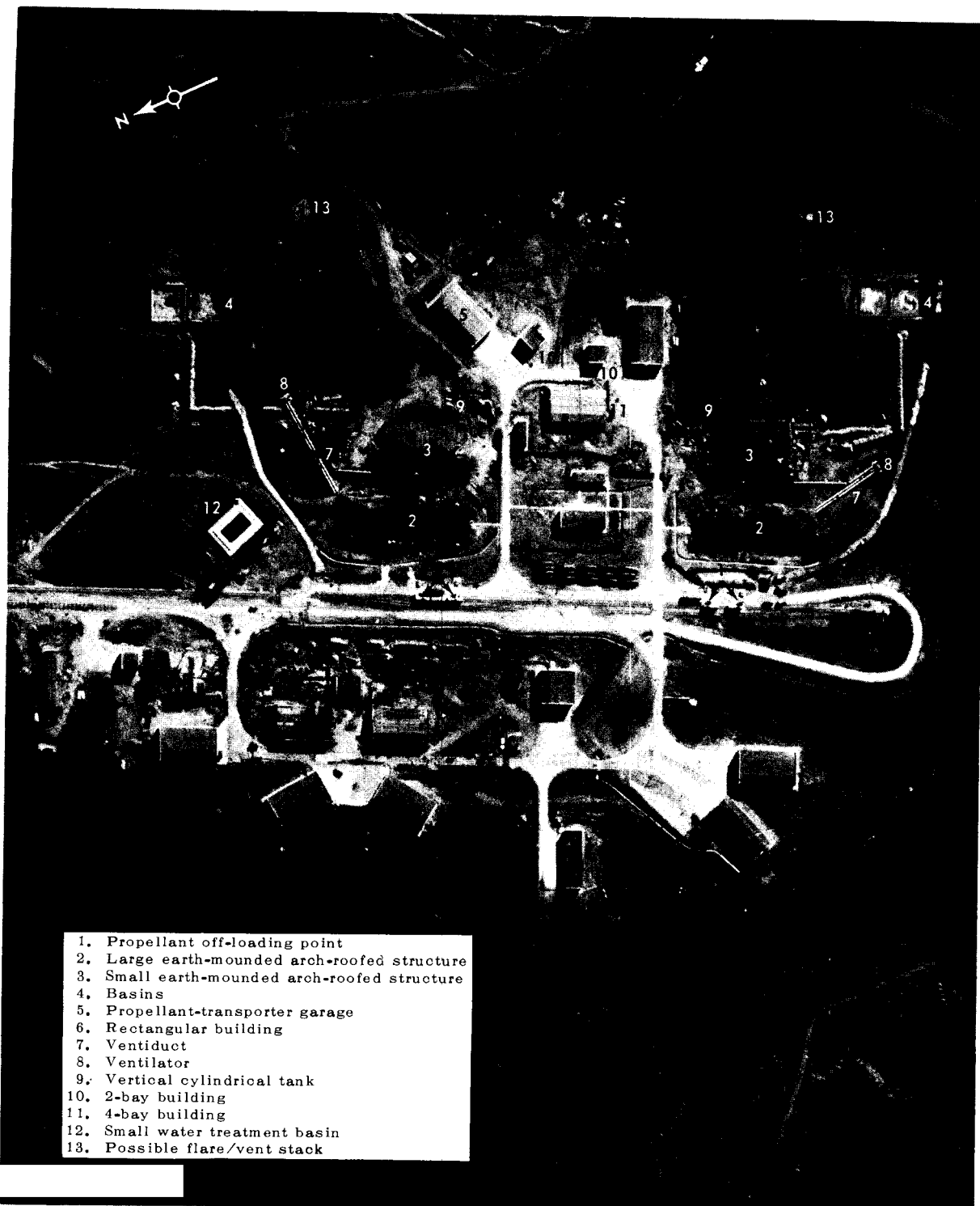


1. Propellant off-loading point
2. Large earth-mounded arch-roofed structure
3. Small earth-mounded arch-roofed structure
4. Basins
5. Propellant-transporter garage
6. Rectangular building
7. Vertical cylindrical tank

FIGURE 11. PROPELLANT STORAGE FACILITY, TATISCHEVO ICBM COMPLEX.

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1. Propellant off-loading point
2. Large earth-mounded arch-roofed structure
3. Small earth-mounded arch-roofed structure
4. Basins
5. Propellant-transporter garage
6. Rectangular building
7. Ventiduct
8. Ventilator
9. Vertical cylindrical tank
10. 2-bay building
11. 4-bay building
12. Small water treatment basin
13. Possible flare/vent stack

FIGURE 12. PROPELLANT STORAGE FACILITY, ALEYSK ICBM COMPLEX.

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1. Propellant off-loading point
2. Large earth-mounded arch-roofed structure
3. Small earth-mounded arch-roofed structure
4. Basins
5. Propellant-transporter garage
6. Rectangular building
7. Ventiduct
8. Ventilator
9. Vertical cylindrical tank
10. 2-bay building
11. 4-bay building
12. Small water treatment basin
13. Possible flare/vent stacks

FIGURE 13. PROPELLANT STORAGE FACILITY, DOMBAROVSKIY ICBM COMPLEX.

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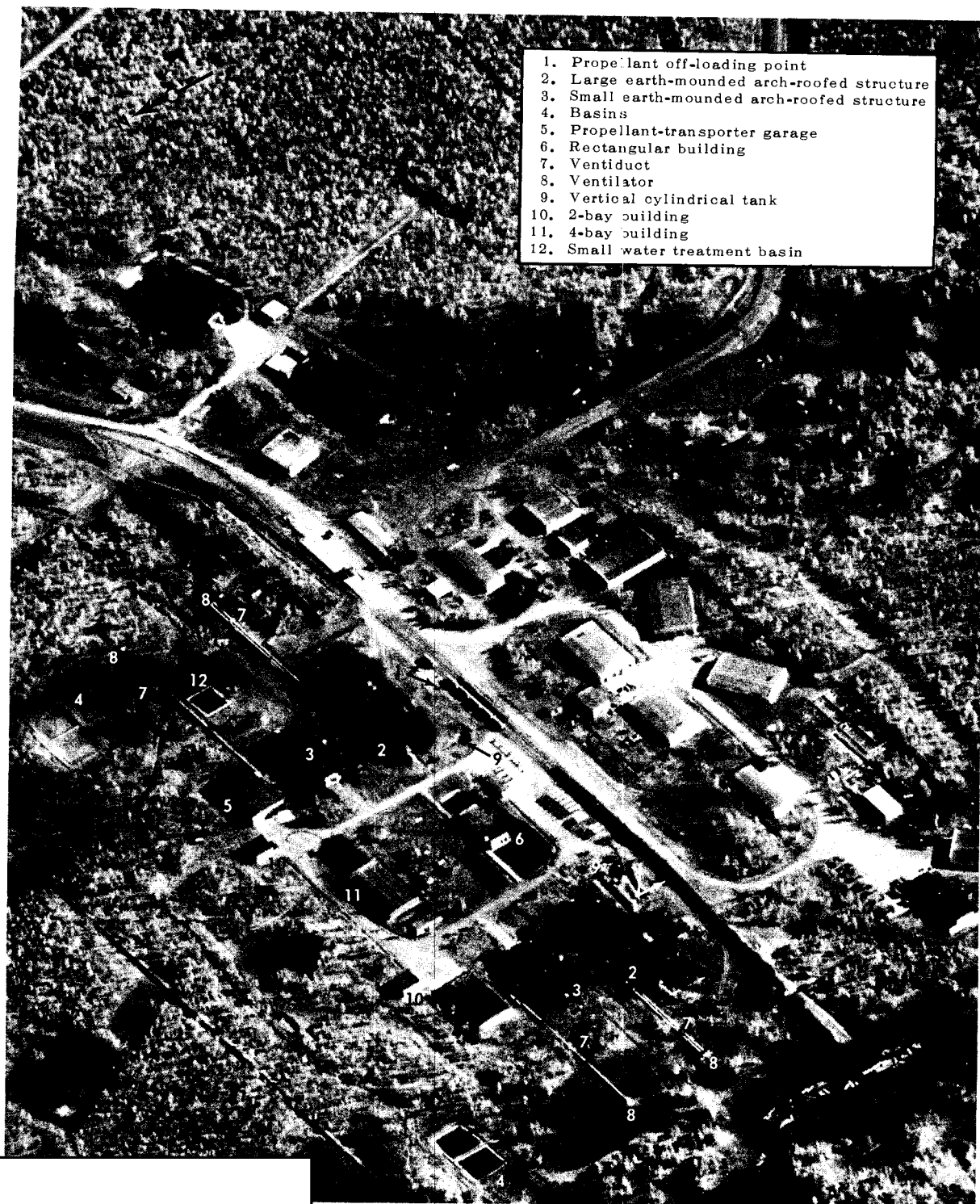


FIGURE 16. PROPELLANT STORAGE FACILITY, UZHUR ICBM COMPLEX.

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TYPE IIIC DEPLOYMENT

Type IIIC deployment is still limited to the Aleysk, Dombarovskiy, Imeni Gastello, Kartaly, Uzhur and Zhangiz-Tobe Complexes identified in [REDACTED]. The site deployment pace at these complexes is continuing at a fairly constant rate of about 5 construction starts per month, as observed earlier through the first 3 quarters of [REDACTED]. Thus far, a total of 130 confirmed or probable sites, ranging in construction stages from early to complete and operational, has been identified. In addition, there are 3 areas of construction activity within known complexes which might possibly develop into valid sites: 1 at Dombarovskiy, 1 at Kartaly and 1 at Uzhur.

Since [REDACTED] 8 new Type IIIC launch sites have been detected: Launch Sites 19 through 21 at Zhangiz-Tobe on [REDACTED], Launch Sites 22 and 23 at Imeni Gastello on [REDACTED], Launch Sites 17 and 18 at Aleysk on [REDACTED] and Launch Site 28 at Kartaly on [REDACTED]. The current inventory of Type IIIC sites, is as follows:

Complex	No. of Confirmed and Probable Sites	No. of Possible Sites
Aleysk	17	0
Dombarovskiy	24	1
Imeni Gastello	23	0
Kartaly	23	1
Uzhur	22	1
Zhangiz-Tobe	21	0
Totals	130	3

Continuing analyses of construction timing at various complexes, as observed on high-resolution photography, has made it possible to ascertain a more definitive evaluation of site construction techniques. It appears that construction of Type IIIC launch sites has quickened during the past several months and some sites in the latest groups are reaching the midstage of construction much earlier. Sites in the initial groups required about 24-27

months for completion; in the second groups, about 16-18 months; and it now appears that some sites may reach completion in less time. For example, Aleysk Launch Site 12 was observed in an early stage of construction in [REDACTED] after Launch Site 4, adjacent to it, had been abandoned. Launch Site 12 progressed to a late stage of construction in just 8 months, and it now appears to be nearing completion. We recognize that Launch Site 12 may represent a unique situation in that the Soviets speeded up construction to complete a group of 6 sites. This represents about one-half the average time to bring a Type IIIC site to this stage of construction. Launch Sites I 3 and I 4 (Type IIIC sites) at Tyuratam were completed in about 14 months and 13 months, respectively. It is believed that there may be several reasons for the Type IIIC program acceleration; either (a) increased construction capabilities brought about by learning-curve application, (b) the desire to achieve a set goal earlier than originally programmed, or (c) to complete a selected number of sites prior to the winter season.

Launch Sites at Rail-to-Road Transfer Points

At all of the Type IIIC complexes except Dombarovskiy, a launch site is being constructed in the vicinity of the rail-to-road transfer point. No electronic facilities or control bunkers have been identified at these sites. These sites cannot be associated with any existing group of 6 sites. The function of these sites is undetermined, but they may serve a complex-wide function.

Current Developments

Since the last revision [REDACTED] some interesting observations have been made at several of the Type IIIC complexes, as revealed by [REDACTED] missions accomplished through [REDACTED].

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ALEYSK

Support buildings at Launch Sites 1 and 3 at Aleysk have been removed, and a canvas-covered transporter about [REDACTED] was adjacent to the silo door at Launch Site 3. [REDACTED]

[REDACTED] The loop roads at Launch Sites 2, 5, 6, and 12 appeared to have been darkened to match the color tone of the surrounding terrain.

DOMBAROVSKIY

Helicopter landing pads are appearing at many sites in the complex. They are observed at Launch Sites 1, 2, 3, and 4 and it appears that they may eventually be installed at all sites. The pads are located adjacent to the launch sites, but outside the security fences. At Launch Site 3, a control site, the L-shaped electronics facility is now complete and back-filled. Cable scars extend east from the control facility, and it can now be confirmed that they join Launch Site 9, the control site for Launch Group B. Approximately mid-way along the cabling there is a secured facility consisting of a flat-roofed building, 5 or 6 small buildings, a possible lattice tower, and an antenna, the function of which is undetermined.

KARTALY

Few significant changes have been observed at the Kartaly Complex since [REDACTED]

[REDACTED] to Launch Site 3. Cabling apparently interconnects Launch Sites 1 and 8, the respective control sites for Launch Groups A and B. Cable scars also extend from Launch Groups A and B to Launch Site 14, the control site for Launch Group C, as well as to individual sites within the respective groups.

UZHUR

A probable canvas-covered transporter was observed at Launch Site 2. This could possibly be a missile transporter and, if so, may indicate that installation of the missile was underway some several months after the site appeared to have been completed. Ten fuel trailers were observed at the rail-to-road transfer point.

IMENI GASTELLO

Helicopter pads are observed at Launch Sites 10 and 11. [REDACTED]

[REDACTED] Launch Site 8 is now complete, and a probable missile transporter and an unidentified piece of equipment were observed on the loop road. In this case the site appears to have just been completed, and is possibly receiving a missile. The silo door was open and a van-type vehicle was parked adjacent to it.

All sites in Launch Group A (1-6) are now complete, and all sites in Launch Group B (7-12) are now in the late stage of construction; the sites in Launch Group G (13-17) are in the midstage of construction. A probable transporter, about [REDACTED] was at Launch Site 5, and a canvas-covered probable transporter was observed at Launch Site 2. Helicopter pads are observed at all sites in Launch Group A. A study is currently underway to determine if there is any correlation between the operational status of the sites and the appearance of helicopter pads.

ZHANGIZ-TOBE

Helicopter pads are observed at Launch Sites 1, 5, and 12. All of the silo doors at Launch Group A were closed, and a probable transporter was positioned on the apron at Launch Site 4. Expansion was continuing at the complex support facility, and a newly identified high-frequency communications facility was

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under construction near the housing area. Survey lines and trails immediately west of the rail-to-road transfer point may be indicative of future launch site development.

TYPE IIID DEPLOYMENT

We have identified a total of 358 confirmed and probable, and 25 possible Type IIID single-silo launch sites at 9 complexes. This represents an increase of 40 confirmed and probable sites over our last revision. Type IIID deployment by complex, with identified associated control and electronic facilities, is shown below:

Complex	No of Sites	Groups (1 x 10)	No of Control Facilities	Electronic Facilities*
Drovyanaya	47	5	4	0
Gladkaya	43	5	2	0
Kostroma	5	1	0	0
Kozelsk	19	2	2	0
Olovyannaya	75	8	9	5
Perm	36	5	4	0
Svobodnyy	30	4	3	0
Tatishchevo	94	10	10	4
Yedrovo	9	2	1	1
	358**	42***	35	

* L-shaped electronic facilities.

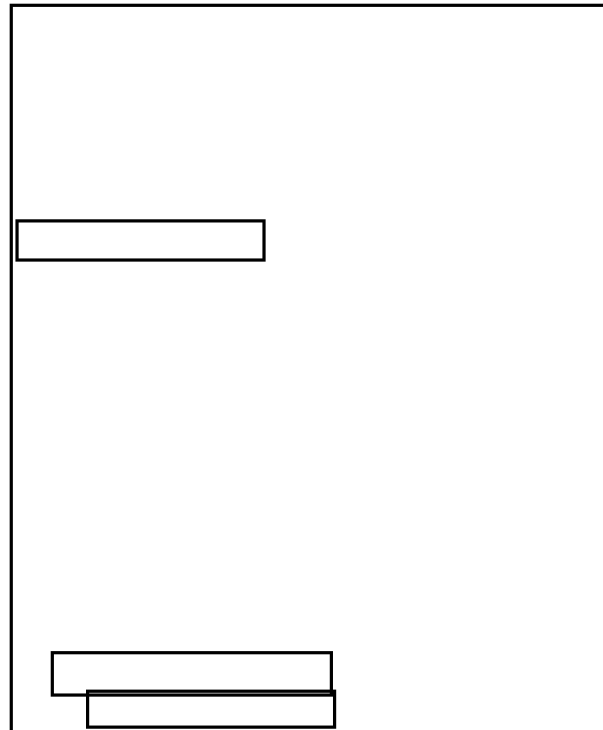
** Does not include 25 sites in possible category.

*** Does not include 2 groups (1 at Tatishchevo and 1 at Kozelsk) in possible category.

Construction Techniques

Photography of the Olovyannaya Complex on [] provided a key for determining the method by which the headworks of the IIID silos are constructed. An open segment in the circular headworks and a hollow concrete square lying nearby (Figure 18) suggest that the headworks are being constructed from prefabricated wedge-shaped blocks (Figure 19). These wedge-shaped blocks, approximately [], have open centers providing a space about [] high and [] for installation of equipment inside the headworks. Analysis of photog-

raphy from previous missions shows that the blocks which form the headworks are laid in 2 tiers providing 2 levels of equipment storage (Figure 20).*



Construction Timing

Some shortening of construction time for individual Type IIID silos has been observed during recent months. The effect that this faster pace will have in bringing IIID silos to completion and operational status in a shorter time period cannot be determined. It is possible, however, that the construction time may be shortened by about 3 to 6 months from the current estimate of about 24-months time lapse from start of construction of the first site in a group to completion of all 10 sites in the group. A launch group is estimated to achieve operational capability in the 90-day period following completion.

*For more details see NPIC/ [] Construction Techniques and Procedures Associated with the Type IIID Launch Silo, Oct 66 (TOP SECRET [])

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The shortened construction time for individual silos has been observed at both older and newer complexes, but none of the accelerated sites or groups has been seen completed. Unfortunately, the more unaccountable delays in construction of the older sites and groups have occurred during the later construction stages. Part of the delay, perhaps, can be attributed to time spent in bringing all sites in a group to completion at about the same time.

A reduction of 2 to 3 months in construction time for deployed silos would be compatible with the time spent completing the Launch Group L for the SS-11 system at the Tyuratam Missile Test Center. Individual sites of the group were completed in 12 to 16 months, and the entire group was completed in about 18 months. Operational capability for the group is estimated to have been reached about 21 months after the start of construction of the first silo.

Until a more complete reanalysis can be made of the stepped-up construction pace, it appears that a 3-month reduction in elapsed time from start of construction to achievement of operational capability is reasonable, and that a 6-month reduction is possible but less likely.

Electronic Facilities

No new information has been obtained about the L-shaped electronic facilities that have been observed at some groups in the Olovyannaya, Tatishchevo and Yedrovo Complexes. The fact that such facilities have not appeared at Launch Group C at Tatishchevo (now complete) and Launch Group H at Olovyannaya (now in a late stage of construction) suggests that the electronic facility may not be scheduled for these groups.

If no electronic facilities are to be installed with certain of the launch groups at Olovyannaya and Tatishchevo, the implication is that whatever reason precipitated Type IIID deployment in 2 modes (i.e., complexes with and without L-shaped facilities) may also be pertinent to these complexes. No inference can be drawn from the presence of only 1 interferometer in the 2 groups that have been identified at Yedrovo because deployment of Type IIID silos is new at that complex.

A listing by control site number, launch group designator, and presence or absence of electronic facilities at each group at the Tatishchevo, Olovyannaya, and Yedrovo Complexes is given below:

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Complex	Launch (Control) Site No	Launch Group	L-shaped Facility	Comments
Tatishchevo	1	A	Yes	
	12	B	Yes	
	26	C	No	No facility expected; group is complete
	36	D	Yes	
	77	E	No	Too early in construction cycle; facility may appear later
	58	F	Yes	
	67	G	No	Facility doubtful; present secured area too small
	81	H	No	Too early in construction cycle; facility may appear later
	91	I	No	Too early in construction cycle; facility may appear later
	--	J	No	Too early; no control site identified yet
	35	--	No	No group association; facility may appear as complex nears completion; secured area large enough
Olovyannaya	24	D	Yes	
	17	E	Yes	
	40	F	Yes	
	25	G	No	Unidentified construction activity within the secured area in close proximity to the control buildings does not conform to the construction activity associated with the L-shaped electronic facility; progress on this activity will be reported in future revisions
	46	H	No	No facility identified; group is in late stage of construction
	55	I	No	Too early in construction cycle; facility may appear later
	60	J	Yes	
	63	K	No	Too early in construction cycle; facility may appear later
	24	--	Yes	No group association; transfer point site
Yedrovo	11	--	Yes	Only 2 groups identified; too early to determine number of facilities planned at this complex

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FIGURE 18. TYPE IIID SILO UNDER CONSTRUCTION, LAUNCH SITE 72, OLOV YANNAYA ICBM COMPLEX.

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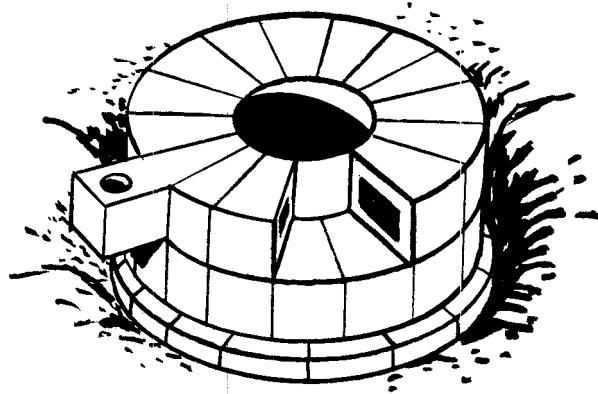
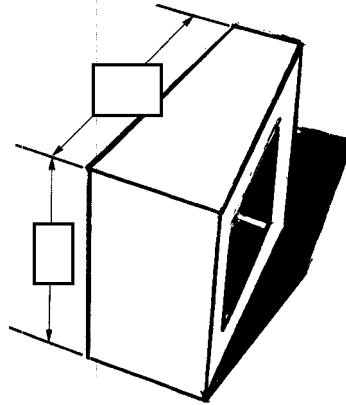


FIGURE 19. ARTIST'S CONCEPT OF PREFABRICATED BLOCK, AND TYPE IIID SILO HEADWORKS UNDER CONSTRUCTION.

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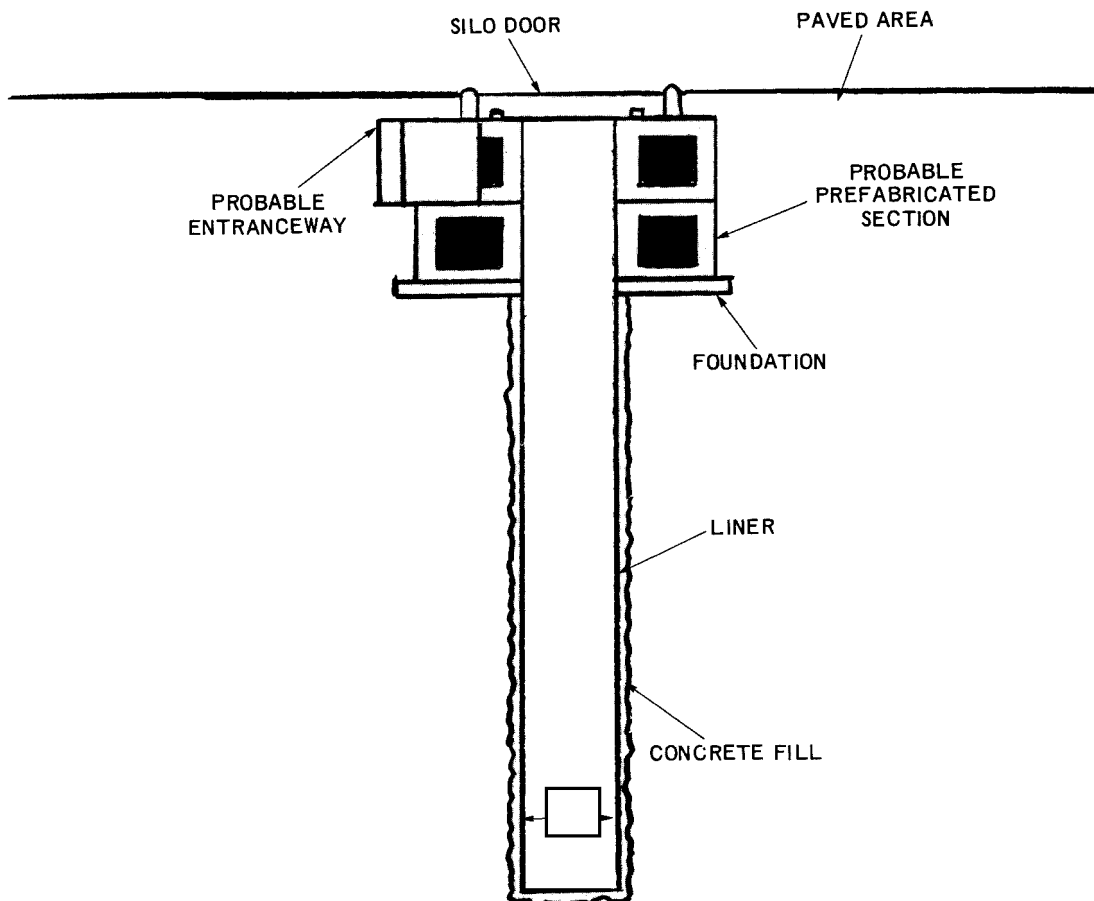


FIGURE 20. CROSS SECTION OF TYPE IIID SILO.

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TYURATAM MISSILE TEST CENTER

Since our last revision, several missions have provided good-to-excellent coverage of the Tyuratam Missile Test Center. Highlights of these coverages include activity at Launch Sites A2 and A3 that appeared to be similar to previously reported activity at Kapustin Yar: the observance of missiles at some launch sites; indications of a construction halt at Launch Sites I2, I3, and I6; the identification of a new launch site designated I7; few signs of activity or site construction progress at Launch Group M; a considerable amount of activity at Launch Complex G; the identification of paired earthen mounds at all sites in Launch Groups L and N; and additional details of activities at other sites.

tails concerning Launch Sites A2 and A3 were obtained from [redacted]. Most probably the launch stands and associated equipment at these sites are identical. Both sites are equipped with permanently emplaced cranes that appear to be similar to those observed on the pads at Launch Sites 1C2 and 1C3 of Launch Complex C at the Kapustin Yar Missile Test Center. Rail cars of unusual configuration seen at these sites have similarly appeared at Tyuratam Launch Sites A2 and A3. This suggests

that the same type of missile, or stages thereof, may be common to these Tyuratam and Kapustin Yar launch sites.

[redacted] missiles were erected on all 3 pads at Launch Complex C. Only once previously have missiles been observed simultaneously erected on adjacent Tyuratam soft launchers. This occurred first in [redacted] and involved 2 pads at Launch Complex C which have long been associated with the SS-7 ICBM. From the standpoint of US-design overpressure criteria, the launch pad spacings at Complex C are not adequate to prevent damage from the explosion of SS-7 missiles erected on adjacent pads. This fact, coupled with the point in time when the referenced missile erections were observed, indicates that loading of adjacent pads is probably reserved for operational training exercises when the explosion hazard would not jeopardize the respective R&D programs.

Although no significant changes were observed in facilities at Launch Complex H, the identification of vehicles and/or pieces of equipment on Pad H2 indicates continuing activity at this site. It is not clear whether the sites at Launch Complex H are being used to launch the TT-4. However, because the TT-4 uses the SS-9 as a booster, Launch Complex H is considered a possible R&D launch point.

There was good coverage of Launch Group I during [redacted]. [redacted] vehicles and/or pieces of equipment were positioned near the silos at Launch Sites I1, I4, and I5. Also, the silo door was open at Launch Sites I1 and I4. Nineteen days later, on [redacted] a 90-foot-long missile was resting on a parked transporter near the I4 silo. Between these 2 coverages only one SS-9 was fired, and that ended in failure on [redacted]. The events observed at Launch Group I on [redacted]

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straddle this firing, and suggest that Launch Site I4 was used. At Launch Sites I2, I3, and I6, little, if any, construction progress has occurred since [] and, to date, no silo headworks have been identified. This could indicate that Sites I2, I3, and I6 were possibly abandoned in favor of Launch Site I7 which was first observed under construction in []. [] It is not yet clear, however, what type of site is planned at I7, but 3 excavations and a probable building have been identified.

Considerable activity was observed at Launch Complex G. In the support area, the administration and housing area was being enlarged by the construction of additional H-shaped buildings. This probably indicates an increased personnel requirement for the westernmost part of the rangehead. The first indication of this expansion was in [] when building construction was in an early stage. Another significant observation in the Launch Complex G support area concerns an unidentified support vehicle parked in the motor pool on []. This vehicle, about 60 feet long with 2 crane-like objects projecting from its front end, is similar to a vehicle parked at Perm Launch Site 38I ([] at the same time that a probable canvas-covered missile transporter was backed up to the silo. These observations suggest that this vehicle is used in loading a missile into a Type IIID silo. The presence of such a vehicle at the Complex G motor pool indicates that the Tyuratam vehicles of this type are maintained there.

Construction continues to progress at Launch Site G1-G2. Coverage from [] revealed that the 2 probable propellant storage buildings flanking both original pads had been enlarged. Considerable ditching was also evident in the launch area, consisting of both

unearthing originally installed conduit and the installation of new conduit. The new conduit primarily linked the enlarged propellant storage buildings with the structures being constructed forward of both original pads. This indicates that this site will continue to be associated with a liquid-fueled system. Equipment and construction materials located near the G2 gantry on [] suggest preparation for modification or dismantling. It is not yet possible to ascertain whether planned launches would require the use of the existing gantries. The lightning arresters that formerly flanked both original pads have been removed, suggesting that future launchings are not planned from either of the original pads. On [] a long open cut extended uprange from both of the original G1 and G2 pads. The shape of the cut resembled the recess into which the erectors observed on Pads G3 and G4 retract. This probably means that similar erectors were removed from the original G1 and G2 pads, and further suggests that firings are not planned from either of the original launch pads.

Considerable construction activity has also begun at Launch Site G3-G4. [] the overall launch area was being enlarged by relocation of the forward part of the site security fence further downrange. []

[] indicated that ditches had been dug in the launch area. At Pad G3 ditching starts on the western side of the site, passes under the pad, and extends toward and under Pad G4. Two buildings have been constructed near this ditch, about midway between the pads. Large-diameter conduit is being installed in this ditch. Also, ditching and conduit have been extended from the apex of the L-shaped electronic facility to the rear of the G3-G4 launch area. Other activity at Launch Site G3-G4 includes the start of construction on a new

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building adjacent to the smaller administration building; the removal of two 55-foot-diameter tanks located between the pads; and unidentified activity near the G3 gantry. The latter consists of a possible shallow excavation and a crane located between the gantry tracks. Two circular objects, possibly service platforms, have been observed near this gantry. If these are in fact service platforms, the G3 gantry may be undergoing modification or repair. We do not know the purpose of the ditching previously mentioned at this site, but the size of the conduit being installed is large enough to permit personnel access.

Cylinders similar to that erected on Pad G6 on [] continue to be identified on recent coverages of Launch Site G5-G6. On [] 14 cylinders were seen near the site security fence and a cylindrical object was resting horizontally near Pad G6; one of the cylinders near the fenceline was lighter-toned than the others. Coverage from []

[] (when 8 cylinders were identified), the presence of these cylinders may possibly be associated with the high firing rate of the SS-11 during recent months. Trajectory backtrack data for SS-11 firings this year indicates that the number of SS-11s identified with Launch Complex G is less than the number of observed cylinders. Therefore, some of these cylinders may be associated with SS-11 launches identified with other launch complexes. It is possible that most, or all, of the used cylinders are returned to the G5-G6 area regardless of the actual launch point. It would appear, therefore, that Launch Site G5-G6 is a focal point for the SS-11 flight test program.

No silo headworks have yet been constructed at any of the 3 single-silo sites at Launch Group M. Construction of these sites probably started in late 1965, but few signs of activity or construction progress have been observed in recent months. Why this stand-down has occurred, and whether it is permanent or temporary in nature, is not yet clear.

Activity was observed at the Type IIID silos at Launch Sites L8 and N1. [] a tall object was erected over both these silos and a long vehicle/piece of equipment was parked nearby. The SS-11 has continually backtracked to the western end of the rangehead, and this is where all Type IIID single silos at Tyuratam are located. The high SS-11 launch rate since late [] suggests that the firing program of this missile may have been expanded to include launches from silos in Launch Group L. The objects observed over the L8 and N1 silos are probably associated with the SS-11 and suggest these silos were being loaded. However, the quality of photography precludes detailed mensuration and interpretation.

[] revealed that all sites in Launch Group N are equipped with paired earthen mounds, as are all sites in Launch Group L. Further, each Type IIID site at the Tatishchevo and Olovyannaya Complexes that had progressed to at least a late construction stage was either equipped with similar mounds, or preparations were underway for their construction. Available photography of Type IIID sites at the other identified deployed complexes was searched but no evidence of these mounds was found. Consequently, paired mounds have so far been identified only at deployed Type IIID complexes which have L-shaped electronic facilities, except for Yedrovo where IIID site construction was

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begin in early 1966.

To date, 2 different on-site mound placement patterns have emerged. Regardless of pattern, the paired earthen mounds are always about 300 to 350 feet apart, and projected diagonal lines between opposite mounds always intersect over the silo. There are few clues to indicate the probable purpose served by these mounds. No observable roads, ditches, or scars extend from any of these mounds but an object which may be a short tower has been seen atop some mounds. If these towers are antennas, they suggest several possibilities: (1) an inner zone detection or surveillance system, possibly like that used to secure operational US MINUTEMAN silos; (2) an on-site electronic facility, possibly for guidance, target damage assessment, and/or redundancy; (3) communications; and (4) pre-launch azimuth alignment for the missile guidance system. Although all of these are considered possibilities, none has yet emerged as our best choice.

In Launch Group K, activity was observed primarily at Launch Site K2. In late [redacted] [redacted] a tall object was erected over the Type IIIC silo at this site and a

long vehicle/piece of equipment was parked nearby. The IIIC silos in Launch Group K were constructed at a leisurely pace, with construction probably starting in the [redacted] period. These sites appeared to be completed in [redacted] and the overall observed construction time was about 27 to 30 months. This represents about a 1 year construction-time difference between the sites in Launch Group K and the IIIC single silos at Launch Sites I1, I4, and I5. The identification of missile-related activity at Launch Site K2 in late [redacted] indicates that outfitting of the silo and installation of the missile was taking place. The length of the construction cycle, and the locations of the launch sites in Launch Group K raise some question as to whether these sites are also intended to accommodate the SS-9 which has been firmly associated with completed silos in Launch Group I. The only new weapon system which has recently emerged into flight test is the TT-4. Insofar as its characteristics are known, it would not be incompatible with Type IIIC silos, including those at Launch Group K, but there is yet no evidence to make a positive association.

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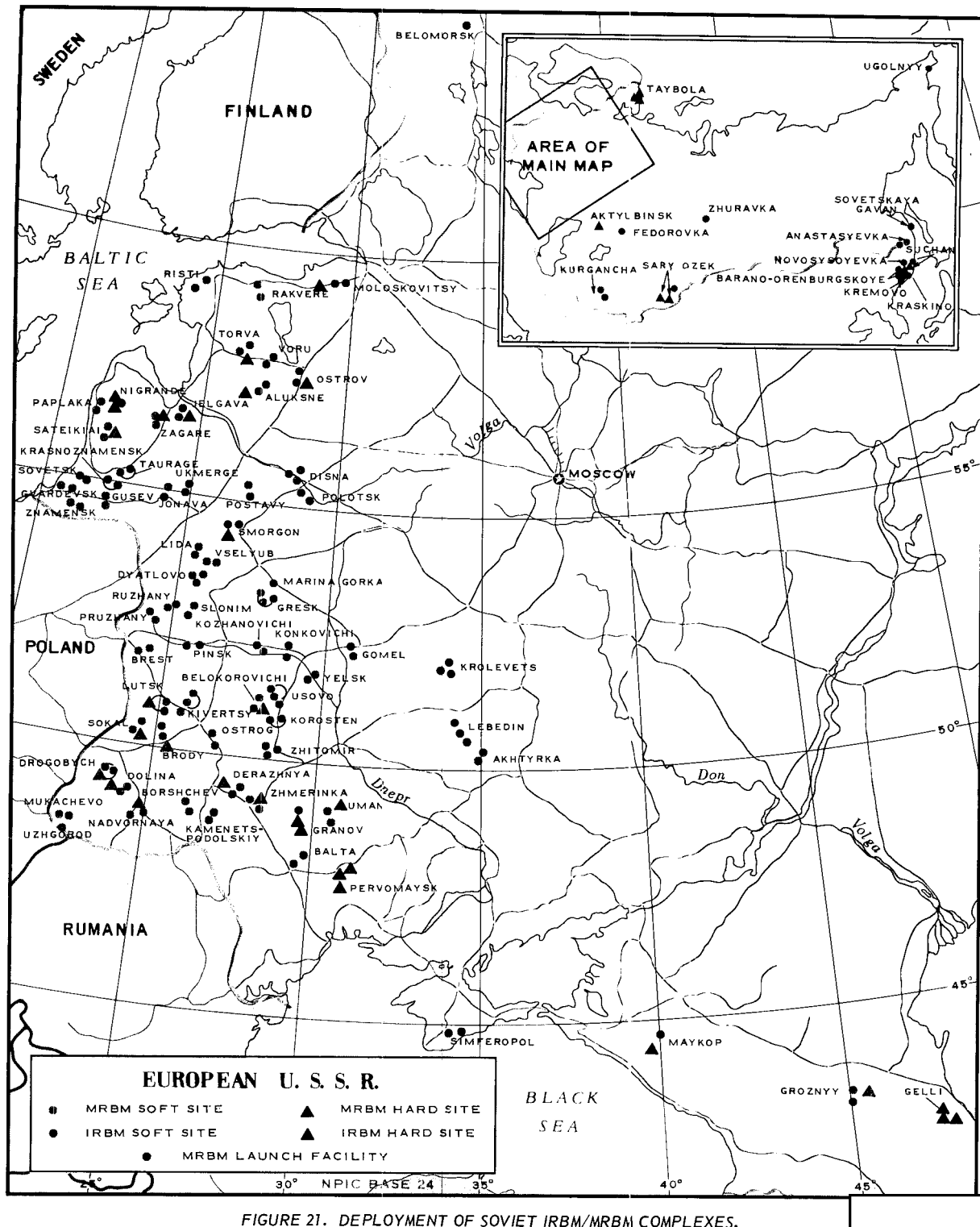
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SOVIET IRBM/MRBM DEPLOYMENT

No major changes in the Soviet IRBM/MRBM force have been observed during the past year. We estimate that the current force comprises somewhat over 700 operational launchers, including some 135 in a hard configuration, deployed at about 200 sites. This force is capable of delivering a devastating attack against Eurasian targets, but consists predominantly of soft configurations concentrated against European targets. The locations of deployed IRBM/MRBM complexes are shown in Figure 21. Typical configurations of the launch sites, and the weapons system associated with each, are depicted in Figure 22.

KAPUSTIN YAR MISSILE TEST CENTER

There is evidence that the Soviets are developing new IRBM/MRBM systems at Kapustin Yar. The most significant construction is at the prototype for hardened MRBM sites, where 3 of the 4 silos have been, or are currently being, modified. At another area, the pad spacing of a soft site suggests an MRBM system. Such modifications have not been observed, to date, at any deployed IRBM/MRBM soft or hard sites.

The SSM bivouac area; the housing, administration, and support areas north and south, warhead areas east and west, and final assembly and checkout area of Launch Complex C; the transmitting communication site; and portions of Launch Sites 4C2, 5C1, Launch Complex G, and the final assembly area and missile storage and handling area of Launch Complex D were covered by [redacted]

A missile exercise was underway on the south pad at Launch Site 5C1. A missile erector and a probable SS-5 missile on a transporter were also observed at this site. Launch Site 4C2 and the Complex C support areas appeared active.

Approximately 40 miscellaneous rail cars were parked on the rail line north of the Launch Complex C final assembly area. Numerous miscellaneous unidentified vehicles were observed in the motor pools for the SSM bivouac area, and in the housing, administration, and support areas for Launch Complex C.

MRBM FIXED FIELD SITES

Coverage from [redacted] revealed that at least 3 of the launch positions at the Konkovichi MRBM launch site appear to be occupied by unidentified equipment. A possible canvas-covered object is located near each of the 2 missile-ready buildings. Approximately 10 unidentified vehicles/pieces of equipment are in the technical section, and approximately 50 unidentified vehicles/pieces of equipment are in the support area. No new construction, changes in facilities, or previously unreported features were observed.

An erector/launcher occupies each of the 2 middle pads at the Vepriai MRBM Fixed Field Site. Oxidizer/fuel transporters are located in the technical section. No new construction, changes in facilities, or previously unreported features were observed.

[redacted] revealed a possible SS-4 missile exercise on 3 of the 4 launch positions at the Novoselki MRBM Fixed Field Site 1. The easternmost launch position contains a possible canvas-covered transporter, a probable erector, 2 probable oxidizer transporters, a probable fuel transporter, a probable cherry-picker, and at least 7 unidentified vehicles/pieces of equipment. The central launch position contains a probable erector, 2 probable oxidizer transporters, a probable fuel transporter, and at least 4 unidentified vehicles/pieces of equipment. The westernmost launch position contains 1 probable erector and a possible cherry picker.

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TABLE 1. SUMMARY OF ESTIMATED STATUS OF IDENTIFIED ICBM, IRBM, AND MRBM LAUNCHERS AT DEPLOYED COMPLEXES, [REDACTED]

Type	Sites	Launchers	Operational	U/C	Type	Sites	Launchers	Operational	U/C
ICBM					IRBM				
IA	3	4	4	0	III	13	50	50	0
IB	2	4	0	4	IV	17	51	51	0
IIA	5	10	10	0	TOTALS	30	101	101	0
IIB	29	58	58	0	MRBM				
IIC	7	14	14	0	I	84	336	336	0
IID	30	60	60	0	II	51	204	204	0
IIIA	23	69	69	0	IV	21	84	84	0
IIIB	3	9	9	0	TOTALS	156	624	624	0
IIIC1/	130	130	44	86	GRAND				
IIID2/	358	358	70	288	TOTALS	188	709	709	0
TOTALS	590	716	338	378					

*Figures include 3 launch silos at Type IIIA and IIB ICBM and Type IV IRBM sites, and 4 launch silos at Type IV MRBM sites. Type-IIIC and IIID ICBM sites contain single silos.

1/Figures do not include 3 sites carried in the possible category.

2/Figures do not include 25 sites carried in the possible category.

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